

Pre-Calculus Final Exam 1 by www.DumbLittleDoctor.com

To get full credits, show all necessary work. No calculators, closed exam.

1. (1 points) $\arcsin\{\sin(\frac{2\pi}{3})\}$ _____

(1 points) Change the degree measure to radian measure: $\pi^\circ =$ _____

(1 points) Solve for: $\log(0.00000001) =$ _____

2. (3 points) Given $u = \langle 1, 3 \rangle, v = \langle 2, -1 \rangle$, perform the calculations for :

(a) $2u \cdot 3v =$ _____

(b) $2u + 3v =$ _____

(c) For $2u + 3v$, magnitude = _____,

3. (4 points) Solve the equation: $\log_2(x+5) - \log_2(x-5) = \log_2 1024$

Answer: $x =$ _____

4. (5 points) Find the summation of the sequence: 8, 16, 32, ..., 65536 (step by step).

5. (3 points) Find the equivalent expressions for

$$\cos^2(\operatorname{arccot} x) + \sin^2(\operatorname{arccot} x) = \underline{\hspace{2cm}}$$

6. (3points) Find the equivalent expressions for $\tan(\sin^{-1} x) = \underline{\hspace{2cm}}$ (step by step)

7. (4 points) First the exact value of $\tan \frac{\alpha}{2}$, given $\sin \alpha = -\frac{4}{5}$ and $\frac{3\pi}{2} < \alpha < 2\pi$.

8. (5 points) Solve the rational inequalities and leave the solution set in interval notation .:

$$\frac{x - 2012}{(x - 2009)(x - 2010)} \geq 0$$

9. (5 points) Solve the inequality and leave the solution set in interval notation:

$$2x^3 + x^2 - 4x - 3 < 0.$$

10. (5 points) Find and simplify the difference quotient, $\frac{f(x+h) - f(x)}{h}$, of $f(x) = x^2 + x - 3$.

11. (5 points) Solve $\sqrt{3x-2} - \sqrt{x} = 2$

12. (3 points) Find the inverse f^{-1} for the function: $f(x) = \frac{1}{2} \cdot 6^{(5x-3)}$. Answer: $f^{-1}(x) =$

13. (5 points) Write the equation of the hyperbola that has asymptotes $y = 2x - 5$ & $y = -2x + 3$, and y-intercepts $(2, 9)$ & $(2, -11)$.

14. (5 points) Solve step by step
$$\left\{ \begin{array}{l} \frac{2}{(x-2)^2} + \frac{2}{(y+1)^2} = \frac{1}{2} \\ \frac{4}{(x-2)^2} + \frac{1}{(y+1)^2} = \frac{2}{3} \end{array} \right.$$

15. (3 points) Write a slope-intercept equation of the line passes through the point $\left(5, -\frac{7}{2}\right)$ and is perpendicular to $8x + 10y = 5$.

16. (3 points) Sketch the graph of the solution set to
$$\begin{cases} x^2 + y^2 < 4 \\ y \leq x - 2 \end{cases}$$

17. (4 points) Find all real numbers that satisfy the equation $\cot 3x = 1$.

18. (5 points) Find the partial fraction decomposition for $\frac{x^2 + x - 31}{(x + 3)^2(x - 2)}$

19. (5 points) For the function $y = -\pi \cos\left(-\frac{2\pi}{3}x + \frac{1}{\pi}\right) - 2$, determine:

(a) (1 points) Domain = _____

(b) (1 points): Amplitude = _____

(c) (1 points) Phase shift = _____

(d) (1 points) Period = _____

(e) (1 points) Range = _____

20. (4 points) Prove the identity step by step: $\frac{\csc x - 1}{\cot x} = \frac{\cot x}{\csc x + 1}$.

21. (5 points) Eliminate the parameter, and identify the graph of the pair of parametric equations:

$$x = -5\sqrt{1 - \sin t}, \quad y = 5 \cos^2 t, \quad -\infty < t < \infty$$

Extra credit(2 points): what's most memorable or funny thing during the lecture or during the discussion? (which you might still remember even when you are over 80 years old)